

MASTER IN SPACE

EARTH OBSERVATION, ASTROPHYSICS, SATELLITE TECHNOLOGIES

*The only master degree in
space sciences & technologies
in Vietnam*

Two specialties:

- Science from Space
- Satellite technologies



USTH University of Science and Technology of Hanoi

MASTER SPACE

Earth Observation - Astrophysics - Satellite technologies

Co-accredited by France and Vietnam
Lectures delivered in english by professors from French universities

The only master degree in space sciences in Vietnam
Space: a high priority in Vietnam for the next decade

Two Specialities:

- **Science from space**
Earth observation, Universe Sciences, Instrumentation
- **Satellite technologies**
Space Engineering, Mechanics, Electronics and telecommunications

Directors:
Assoc.Pr. Phạm Anh Tuấn
Director of Vietnam National Satellite Center
Dr. Yannick Giraud-Héraud
University of Paris Diderot, CNRS

With
Pr. Benoit Mosser
Paris Observatory
Dr. Eric Nuss
Montpellier University

Contact:
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(+84 4) 37 91 77 47

Informations:
<http://www.usth.edu.vn/space>

Logos: Paris Diderot, VNSC, CNES

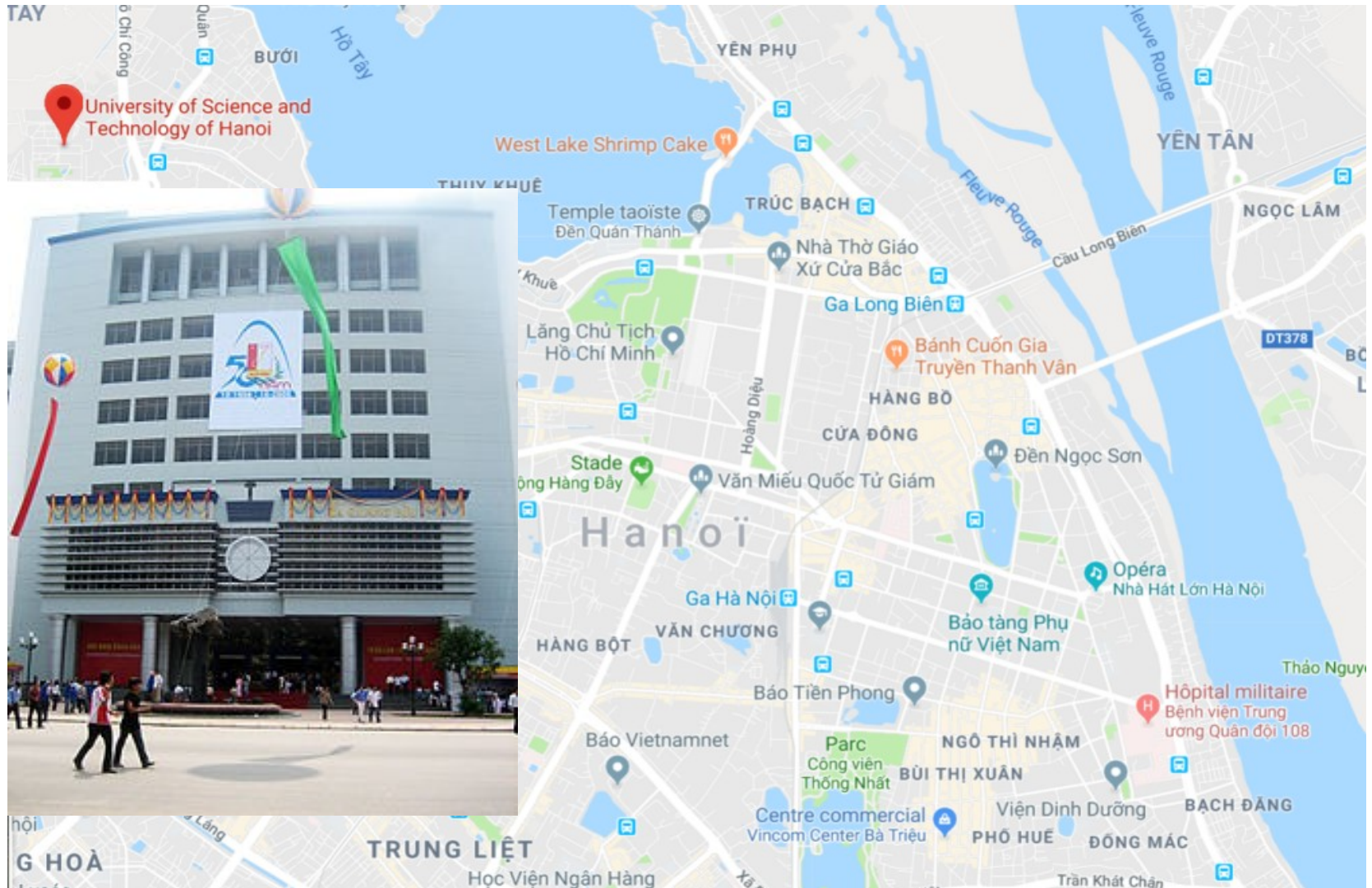
The beginning ...

- 2009: Intergovernmental agreement between Vietnam and France for an International Standard Public University in Hanoi
- Strong support from the French Government, Vietnam Academy of Science and Technology (VAST), Asian Development Bank and the Consortium of 42 French universities and researching organizations
- 100 MEu between 2010 and 2020



USTH location in Hanoi

Currently located in Education and Services Building, Vietnam Academy of Science and Technology (VAST)



Master

Medical
Biotechnology
Vegetal
Biotechnology
Pharmacology

Master

Advanced Materials
Science and
Nanotechnology

Master ICT

Information and
Communication
Technology

Bachelors
(8 specialties)



Master WEO

Water
Environment
Oceanography

Master

Energy and
Valorisation

Master SPACE

Earth Observation
Astrophysics
Satellite Technologies

First students in 2012/2013 !

BACHELOR

Space and Applications

B1: Common year (languages, fundamental sciences)

Year	Semester	Name of course	ECTS
B1	S1	FL and MS	8
		Scientific Courses	22
		Mechanics	2
		Electromagnetism	4
		Cellular Biology	3
		General chemistry I	3
	Linear Algebra	3	
	Calculus I	3	
	Introduction to Informatics	4	
			30
	MS	4	
	Scientific Courses	30	
	S2	Calculus II	3
Genetics		3	
Biochemistry		3	
Basic programming		4	
Organic chemistry		3	
General chemistry II		3	
Practical chemistry		2	
Thermodynamics		1	
Optics and Quantum mechanics		4	
		30	

Contacts:

Coordinator: Dr. Nguyen Xuan Truong

Email: nguyen-xuan.truong@usth.edu.vn **Tel:** (+84-4) 3791 8527

Academic assistant: Ms. Kieu Thi Minh Quyen

Email: kieu-thi-minh.quyen@usth.edu.vn **Tel:** (+84-4) 3 791 8516



B2 and B3: Engineering sciences and Engineering tools:

optics, thermodynamics, fluid mechanics, electronic, automatism, data and image processing, satellite technology, remote sensing, space system design, product design by CATIA, satellite sensor, ...

Year	Semester	Code	Name of course	ECTS
B2 - Second year	S3	Foreign Languages		8
		FR2.1	French	8
		Management Sciences		2
		MS2.1	Law on intellectual property rights	1
		MS2.2	Project Management	1
		Scientific Courses		20
		MATH2.1	Probabilities and Statistics	3
		MATH2.2	Numerical methods	3
		MATH2.3	Matlab Initiation	2
		MATH2.4	Mathematic for Physicist	3
	S4	SA2.1	Classical Mechanics II	3
		SA2.2	Fluid Mechanics	3
		SA2.3	Thermodynamics II	3
		Total		30
		Scientific Courses		30
		SA2.4	Electromagnetism II	3
		SA2.5	Physical Optics	3
		SA2.6	Electronics (<i>Analog and Digital</i>)	4
		SA2.7	Quantum Mechanics	3
		SA2.8	Introduction to Astronomy	2
SA2.9	Introduction to Earth System	3		
SA2.10	Control System	3		
SA2.11	Finite Element Modeling Methods	3		
SA2.12	Mechanics of Materials	3		
SA2.13	Product Life-cycle Management (PLMCC)	3		

Year	Semester	Code	Name of course	ECTS
B3 - Third year	S5	Foreign Languages		7
		FR3.1	French	7
		Management Sciences		2
		MS3.1	Scientific writing	2
		Scientific Courses		21
		SA3.1	Automatism/Industrial data processing	4
		SA3.2	Signal and Image processing	4
		SA3.3	Introduction to Space System	3
		SA3.4	Space System Design I	3
		SA3.5	Product Design (PLMCC-Catia V6)	3
	SA3.6	Communication, Antenna and Microwaves	4	
	Total		30	
	S6	Scientific Courses		30
		SA3.7	Introduction to Relativity	2
		SA3.8	Remote sensing of Earth's surface	3
		SA3.9	Data acquisition & Satellite sensors	3
		SA3.10	Space System Design II	3
		SA3.11	Space materials	3
		SA3.12	Photonics and Optoelectronics	2
		SA3.13	Introduction to Astrophysics and Instrumentation	2
Option for <u>professional certificate by PLMCC/ Dassault Systèmes</u>				
SA3.14		Advanced Product Design (PLMCC-Catia V6)		
G3.1	Group project (3 months)	3		
I3.1	Internship (3 - 6 months)	9		

What is SPACE Master ?

The only master degree in Space Science in Vietnam

Vietnamese Partner



Master SPACE

(Earth Observation, Astrophysics, Satellite Technologies)



French Consortium



UNIVERSITÉ
PARIS-EST CRÉTEIL
VAL DE MARNE



CENTRE NATIONAL D'ÉTUDES SPATIALES



What is SPACE Master?

VNREDSAT1



Two specialties:

- **Master in Science from Space**
- **Master in Space Engineering**

Study courses:

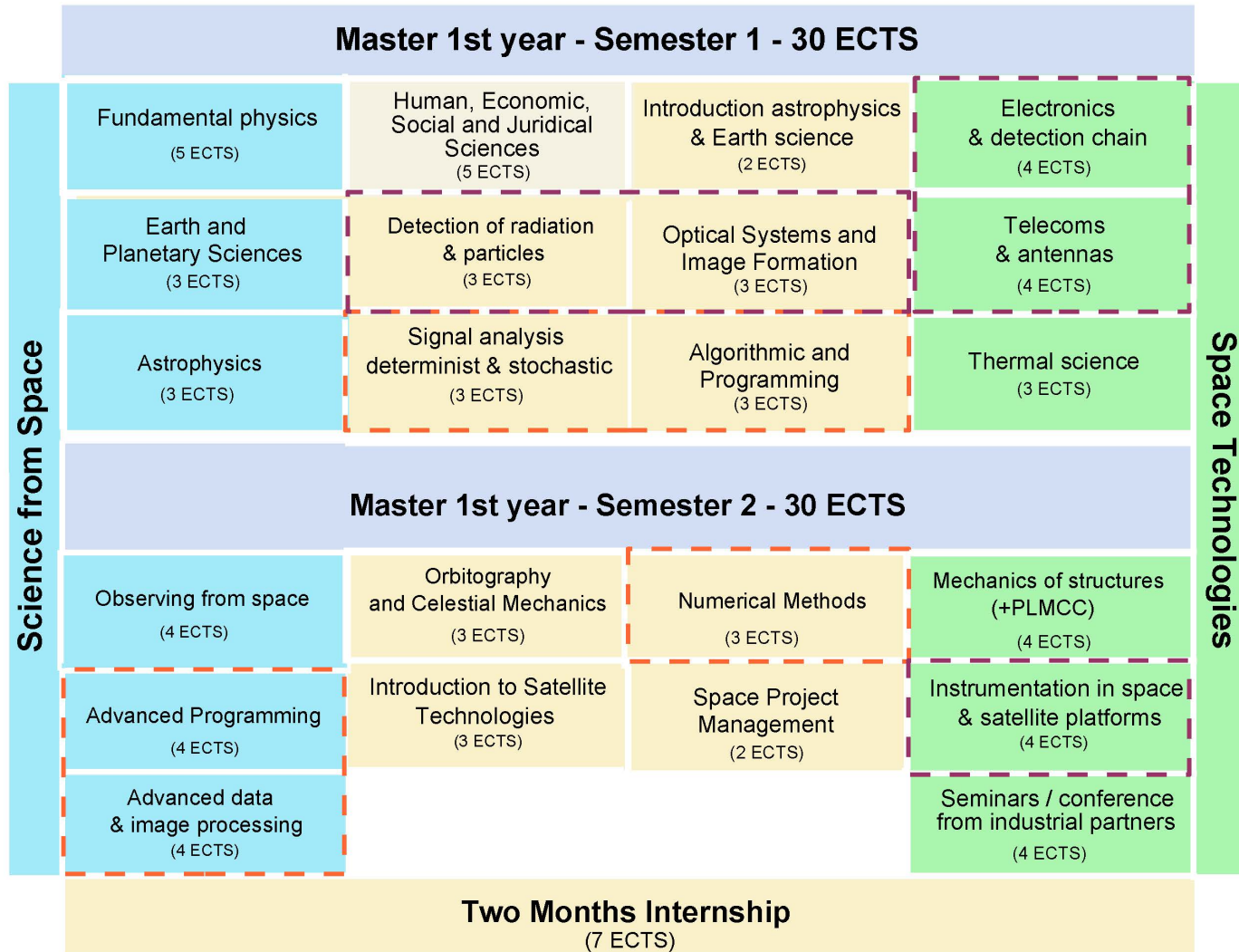
- International level lectures in physics, astrophysics, space engineering, data analysis and image processing
- International professors from prestigious French and Vietnamese universities
- 2 years, equivalent to 60 ECTS each year.
- Courses in English.



Links with industry

8 months internship at international R&D and space manufactory facilities (financial support to go to France).

M1 study program



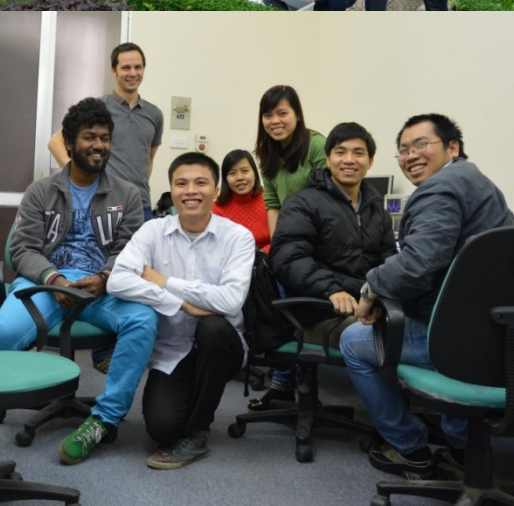
M2 study program

Master 2nd year - Semester 3 - 30 ECTS					
	Human, Economic, Social and Juridical Sciences (5 ECTS)	Observational Techniques (3 ECTS)	Space & Application Project (3 ECTS)	Spacecraft Architecture (3 ECTS)	
Science from Space	Earth Observation: Theory and Detection (2 ECTS)	Earth Observation: Applications (3 ECTS)	Earth Observation Engineering (3 ECTS)	Global Navigation Systems, Telemetry and Telecommunications (5 ECTS)	Space Technologies
	Comparative Planetary Science (2 ECTS)	Advanced Astrophysics (4 ECTS)	Effect of Ionizing Radiation on Components (2 ECTS)	Finite Element Method and Control Engineering (2 ECTS)	
	Geomatic Database (2 ECTS)	Data Processing and Numerical Simulations (3 ECTS)	Attitude Determination and Control Systems (2 ECTS)	Cryogeny and Vacuum Techniques (2 ECTS)	
Master 2nd year - Semester 4 - 30 ECTS					
Six Month Internship (30 ECTS)					

- Experimental lab work or on-computer tutorial
- Location:
 - Computer room R.12, Bldg. 2H
 - SA laboratory R.612, Bldg. USTH
 - Observatory at HNUE
- Teaching modules:
 - Electronics and Automatic Control
 - Signal Analysis and Image Processing
 - Telecoms, Antennas, Microwaves
 - Remote sensing
 - Particle Interaction with Matter
 - Programming



Student photo gallery



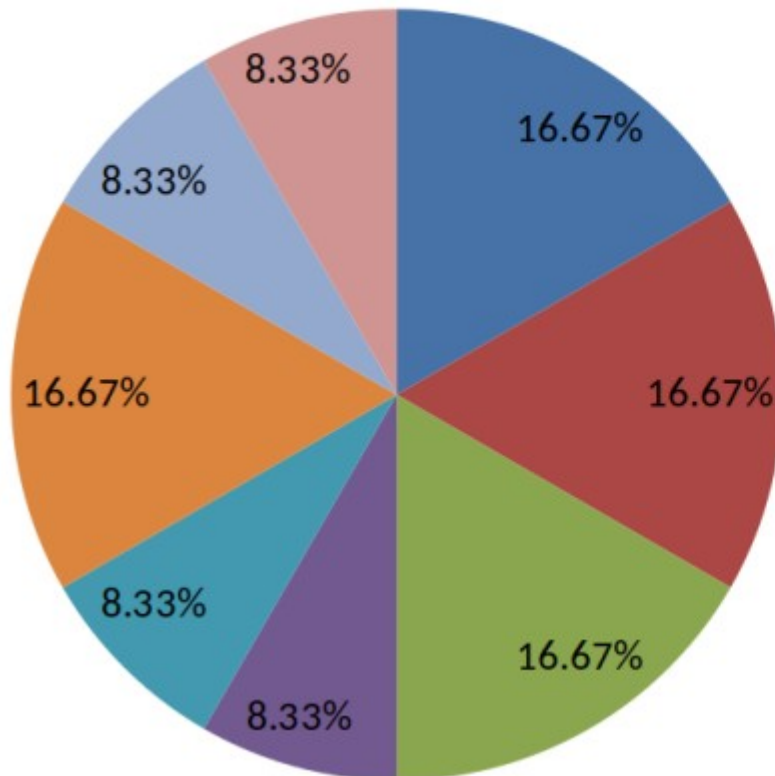
Student photo gallery

2012-2013



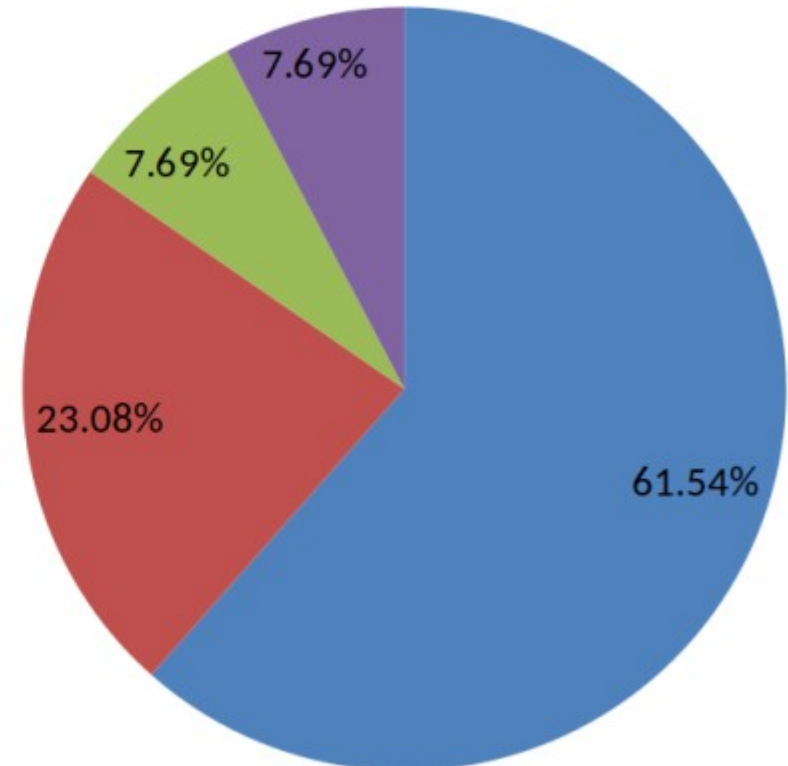
University Origin (2014-2015)

■ HUST ■ HUS ■ VNU ■ HNUE ■ Abroad ■ Quy Nhon ■ Da Nang ■ Hue



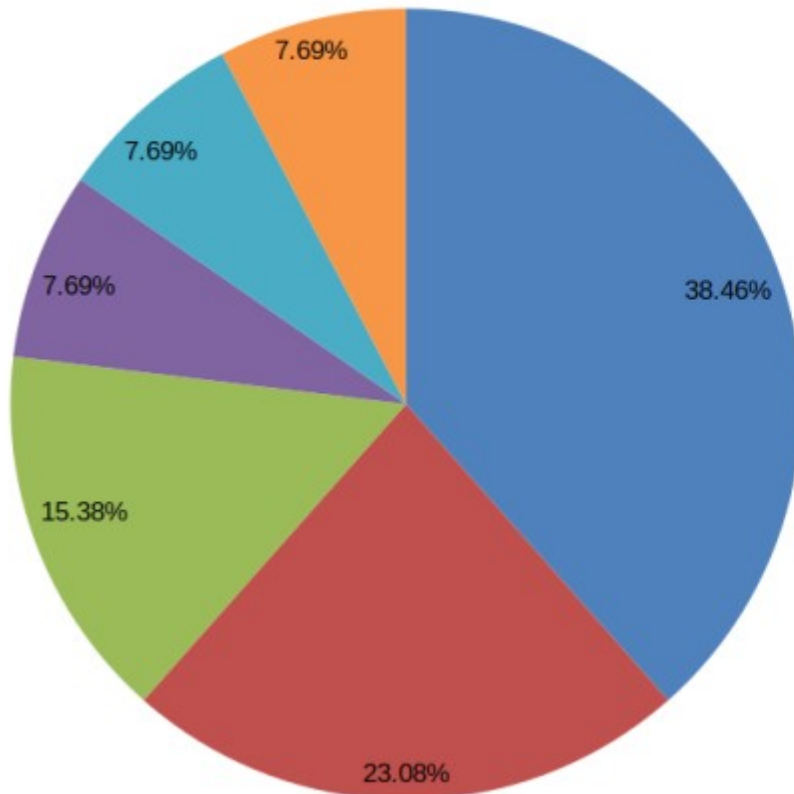
Place of birth (2014-2015)

■ Nord ■ Center ■ South
■ Abroad



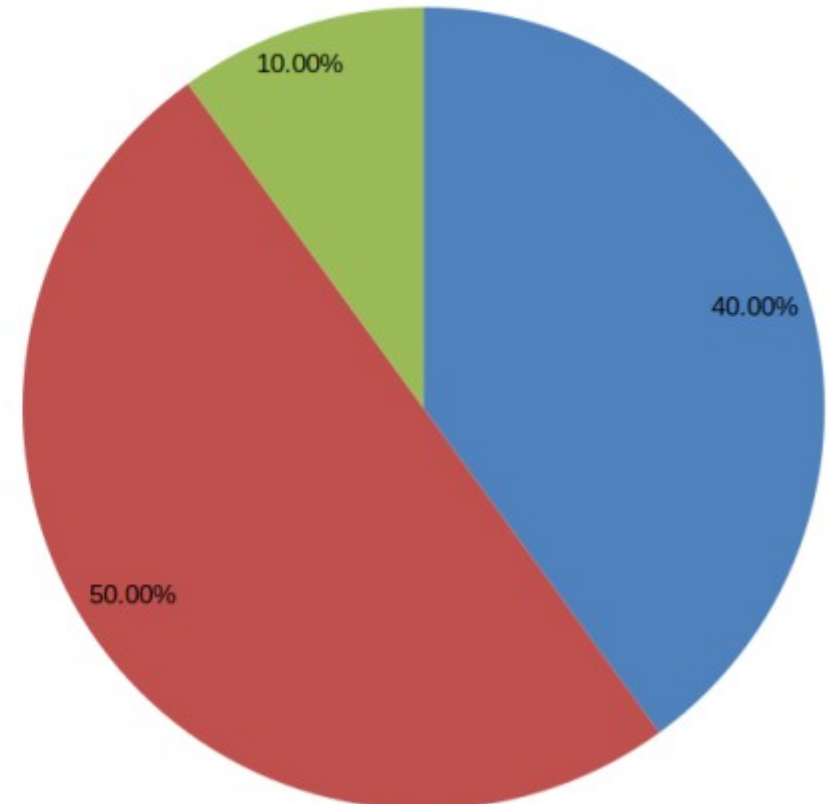
Position after graduation (2014-2015)

- 911 PhD ■ PHD France ■ VNSC
- Teacher ■ PHD Taiwan ■ PhD Vietnam



PhD thesis field (2014-2015)

- Remote Sensing, Earth Observation
- Astrophysics
- Satellite Technologies

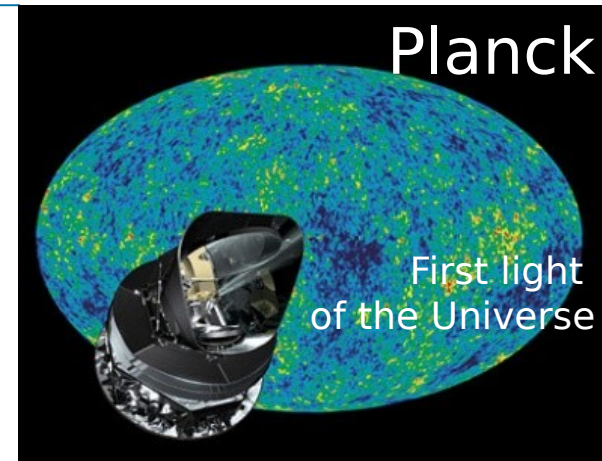
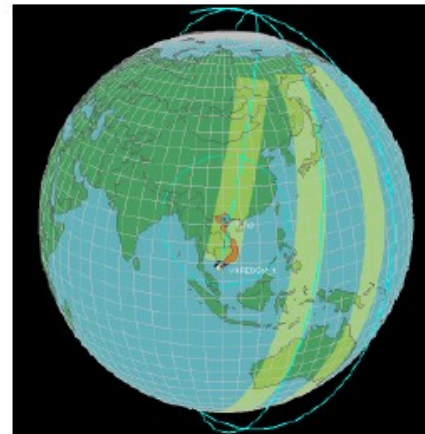
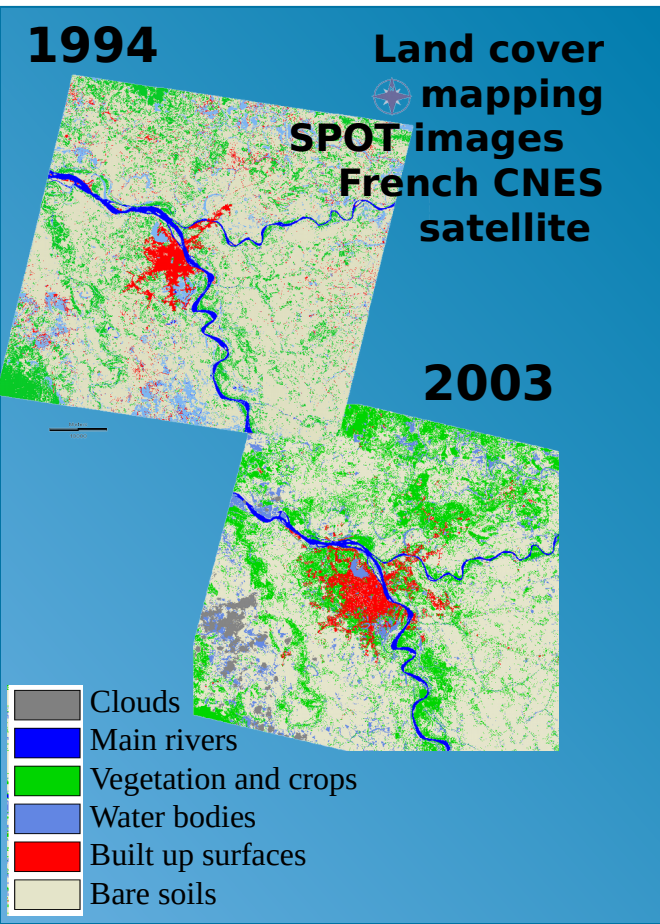


Science from Space



Earth Observation

Astrophysics



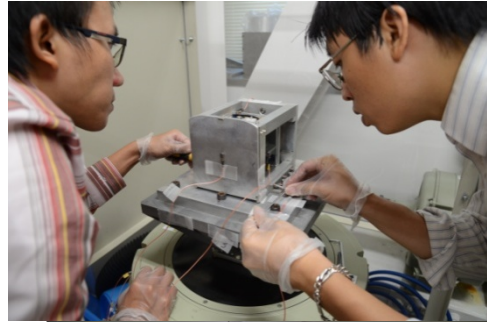
Satellite Technologies

Learn the cutting edge development of space technology

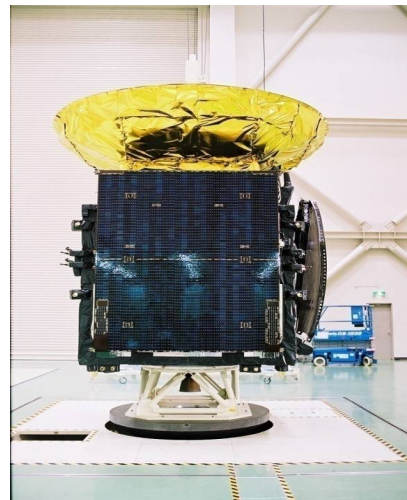


VNREDSAT-1 (funded by France)
built by EADS/ASTRIUM

Nano-satellite technology (VAST STI&VNSC – FPT University)
opens the way for the development of space industry in Vietnam



Thermal vacuum Test Facility



Satellite
Integration Facility

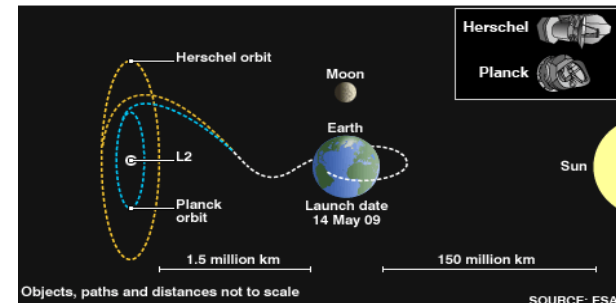
**Vietnam National Satellite Center
(Hoa Lac)**



Satellite operation center

Orbital design
and tracking

DISTANT OUTPOST: HERSCHEL AND PLANCK IN ORBIT



NanoSatellites potentiel

WORKSHOP

INTENS

**INstrumentation Testing of advanced Electronics
 and detectors in space environment using
 NanoSatellites**

Atelier autour des nanosatellites en France

Tests et qualifications des composants électroniques embarqués
Avantages et contraintes des nanosatellites
Identification des technologies à tester sur les nanosatellites
Verrous technologiques et faisabilité
Incubateur de projets

Mr. Compin, Matthieu
 Mr. Dusseau, Laurent
 Mr. Feinstein, Fabrice
 Mr. Giraud-Héraud, Yannick
 Mr. Halloin, Hubert
 Mr. Lognonné, Philippe
 Mr. Nuss, Eric
 Mr. Prêle, Damien
 Mr. Saigné, Frédéric
 Mr. Voisin, Fabien
 Mr. Zurbach, Claude

14 et 15 novembre 2013
Université Montpellier 2

Programme et inscription obligatoire :

www.tinyurl.com/INTENS2013



Space Centers in Vietnam



**Center of Human
Resource Development in
Space Technology**



Hoàng Sa **Vietnam Space Center in
HHTP**



**Space Application Center
in Ho Chi Minh City**

Phú Quốc

Côn Đảo

Nha Trang








Trường Sa



Nha Trang Observatory



USTH-SPACE PhD students

No	Photo	Name	Title	Advisor	Laboratory	University	Country	Funding	French ED
1		Hoàng Đức Thường	Optimization of the next generation CMB satellite missions	Guillaume Patanchon, Yannick Giraud-Héraud	APC	Université Paris Diderot	France	Vietnam 911	560
3		Lê Mai Sơn	The surface heat fluxes estimation using remote sensing data	Yuei-An Liou, Hwa Chien	Hydrology Remote Sensing Laboratory	National Central University	Taiwan	Taiwan National Central University	

5		Phan Thanh Hiền	Design, development and inflight exploitation of IGOSAT satellite payloads for measuring the radiative content of low-earth orbit and in the ionosphere.	Hubert Halloin, Philippe Laurent	APC	Université Paris Diderot	France	Vietnam 911	560
6		Phan Thị Hoa	Rice monitoring using radar remote sensing. From research to applications.	Thuy Le Toan, Mehrez Zribi	CESBIO	Université Paul Sabatier (Toulouse)	France	CIFRE Telespazio	173
7		Bùi Văn Tuấn	Galaxy cluster detection and photometric redshifts for cosmology in the context of the Esa's Euclid mission	Cyrille Rosset, Volker Beckmann	APC	Université Paris Diderot	France	Vietnam 911	560

8		Jasinghege Don Prasanna Deshapriya	Etude comparée de la composition des surfaces des planètes naines, des objets transneptuniens, et des comètes à partir des données recueillies in situ.	Antonella Barucci	LESIA	Université Paris Diderot	France	CD UPD	127
9		Nguyễn Hoàng Phương Thanh	Chemical origin of N2 and CO differential depletion in prestellar cores	Laurent Pagani, François Dulieu	LERMA	Université de Cergy-Pontoise	France	French Labex Michem	127
10		Hoàng Quốc Nam	Analysis on Mekong delta's soil (10N provinces) under climate change and measures proposal	Luu The Anh	VAST/Institute of Geography	VAST/GUST	Vietnam	VAST/Institute of Geography	
11		Trần Đức Dũng	Etude du spectre d'absorption de l'oxygène en infrarouge proche et application à la télédétection des gaz à effet de serre dans l'atmosphère.	Ha Tran, Juan Cuesta	LMD	Université Pierre et Marie Curie	France	CD UPMC	129
12		Nguyễn Trần Hoàng	Weakened cell phenomenon modelling simulation	Alain Michez, Frédéric Wrobel	IES	Université de Montpellier	France	CNES - TRAD	166
13		Nguyễn Tùng Lâm	Etudier les superamas d'étoiles dans les galaxies à flambées à l'époque de JWST	Damien Gratadour, Daniel Rouan	LESIA	Université Pierre et Marie Curie	France	CD UPMC	127

Graduated PhD students

No	Photo	Name	PhD thesis	PhD defense	Current work	Institution	Place	Contact
1		Phạm Đức Bình	<i>Satellite remote sensing of the variability of the continental hydrology cycle in the lower Mekong basin over the last two decades *</i>	February 6, 2018 **	Postdoctoral researcher	CEREGE	Aix-en-Provence, France	phamducbinhk51fetbk@gmail.com
2		Lê Ngọc Trâm	<i>Bow shock chemistry in the interstellar medium *</i>	March 28, 2018	Research assistant	ENS Paris	Paris, France	lengoctramlyk31@gmail.com

Peer-reviewed journals (* means corresponding author if not first author)

2018 :

1. Nguyen, TH., SK. Min, S. Paik, and D. Lee, 2018: Time of emergence in regional precipitation changes: an updated assessment using the CMIP5 multi-model ensemble Clim. Dyn., doi:10.1007/s00382-018-4073-y
2. H. Phan, H. Halloin, P. Laurent: IGOSat - A 3U Cubesat for measuring the radiative/electrons content in low Earth orbit and ionosphere, Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, 2018, ISSN 0168-9002, doi: 10.1016/j.nima.2018.03.065

2017 :

1. Pham-Duc, B., C. Prigent, and F. Aires, 2017: Surface water monitoring within Cambodia and the Vietnamese Mekong Delta over a year, with Sentinel-1 SAR observations. Water, doi:10.3390/w9060366
2. Pham-Duc, B., C. Prigent, F. Aires, and F. Papa, 2017: Comparisons of Global Terrestrial Surface Water Datasets over 15 Years. J. Hydrometeor., 18, 993–1007, doi:10.1175/JHM-D-16-0206.1
3. L. N. Tram, P. Lesaffre, S. Cabrit, A. Gusdorf, P. T. Nhung, 2017: H₂ emission from non-stationary magnetized bow shocks, Monthly Notices of the Royal Astronomical Society, 473 (2), 1472–1488, <https://doi.org/10.1093/mnras/stx2334>.
4. Ngo-Thanh, H., T. Ngo-Duc*, H. Nguyen-Hong, P. Baker, T. Phan-Van, 2017: A distinction between rainy season and summer season over the Central Highlands of Vietnam, Theoretical and Applied Climatology, doi:10.1007/s00704-017-2178-6.
5. Du-Duc, T., C. Kieu, T. Ngo-Duc, 2017: Initializing the WRF Model with Tropical Cyclone Vital Records based on the Ensemble Kalman Filter Algorithm for Real-Time Forecasts, , Pure and Applied Geophysics, doi:10.1007/s00024-017-1568-0.

Contact us

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Telephone: (+84-4) 37 91 77 47 / 48

• Visit us at www.usth.edu.vn/space

• Follow us at <https://www.facebook.com/Space.USTH>



The image shows a Facebook page for the Space & Applications Department at USTH. The cover photo features a group of graduates in blue and red regalia holding red diplomas, with a man in a suit standing in the center. The page header includes the USTH logo and the text "Space & Applications Department - USTH College & University". Below the header, there are navigation tabs for "Timeline", "About", "Photos", "Reviews", and "More". The "About" section lists the department's focus: "Khoa Vũ Trụ & Ứng Dụng" and "The only Master Program in Earth Observation, Astrophysics, and Satellite Technology (EAST) in Vietnam". A recent post from April 3 at 9:30am titled "MASTER PROGRAM: CALL FOR APPLICATIONS 2015 - 2016" is visible, with a thumbnail image of a satellite in space.



The image displays the USTH website for the Master Space program. The header features the USTH logo and the text "EARTH OBSERVATION - ASTROPHYSICS - SATELLITE TECHNOLOGIES" and "SPACE & APPLICATIONS DEPARTMENT". Below the header, there is a navigation menu with options like "ENGLISH HOME", "ENGLISH ACADEMIC PROGRAM", "ENGLISH SPACE", "ENGLISH LABORATORY", and "ENGLISH LIBRARY". The main content area includes a "Laboratory" section with a photo of students in a lab, an "INTRODUCTION" section describing the program as a unique educational structure in Vietnam, and a "MENU" section with links to "ACADEMIC PROGRAM", "LABORATORY", and "HOW TO APPLY". A prominent "MASTER SPACE" banner features the text "The only master degree in space sciences in Vietnam" and "Space: a high priority in Vietnam for the next decade". Below the banner, there are sections for "Two Specialities: Science from space" and "Satellite Technology". A "MASTER PROGRAM: CALL FOR APPLICATIONS 2015 - 2016" section is also present, detailing the application process and eligibility. The footer includes a "GPU for Nano Satellite Project" section and a "Partners" section with logos for VNSC, Observatoire de Paris, and Université de Montpellier.

Department Staffs

Director:

Dr. **Yannick Giraud-Héraud** (CNRS/UPD)

Co-Director:

Assoc. Prof. Ngo Duc Thanh (USTH)

Montpellier University:

Assoc. Prof. **Eric Nuss**

Paris Diderot University:

Dr. **Yannick Giraud-Héraud**

Paris Est Créteil University:

Prof. **Martin Schwell**

Paris Observatory:

Prof. **Benoît Mosser**

CNES:

Hubert Diez



Dr. Yannick Giraud-Héraud



Assoc. Prof. Ngo Duc Thanh



Prof. Benoît Mosser



Assoc. Prof. Eric Nuss



Prof. Martin Schwell

Academic assistant:

Ms Vân Anh (space@usth.edu.vn)

1st Master year coordinator:

Dr. **Cyrille Rosset** (CNRS/UPD)

2nd Master year coordinator:

Dr. **Pierre Lesaffre** (CNRS/Paris Observatory)

« Satellite technologies » coordinator:

Assoc. Prof. **Damien Gratadour** (UPD/Paris Observatory)

"Science from space » coordinator:

Assoc. Prof. **Guillaume Patanchon** (UPD)

Webmasters:

Msc. **Phan Thanh Hiền**

Msc. **Hoàng Đức Thường**



Dr. Cyrille Rosset



Dr. Pierre Lesaffre



Assoc. Prof. Damien Gratadour



Assoc. Prof. Guillaume Patanchon



Msc. Phan Thanh Hiền



Msc. Hoàng Đức Thường

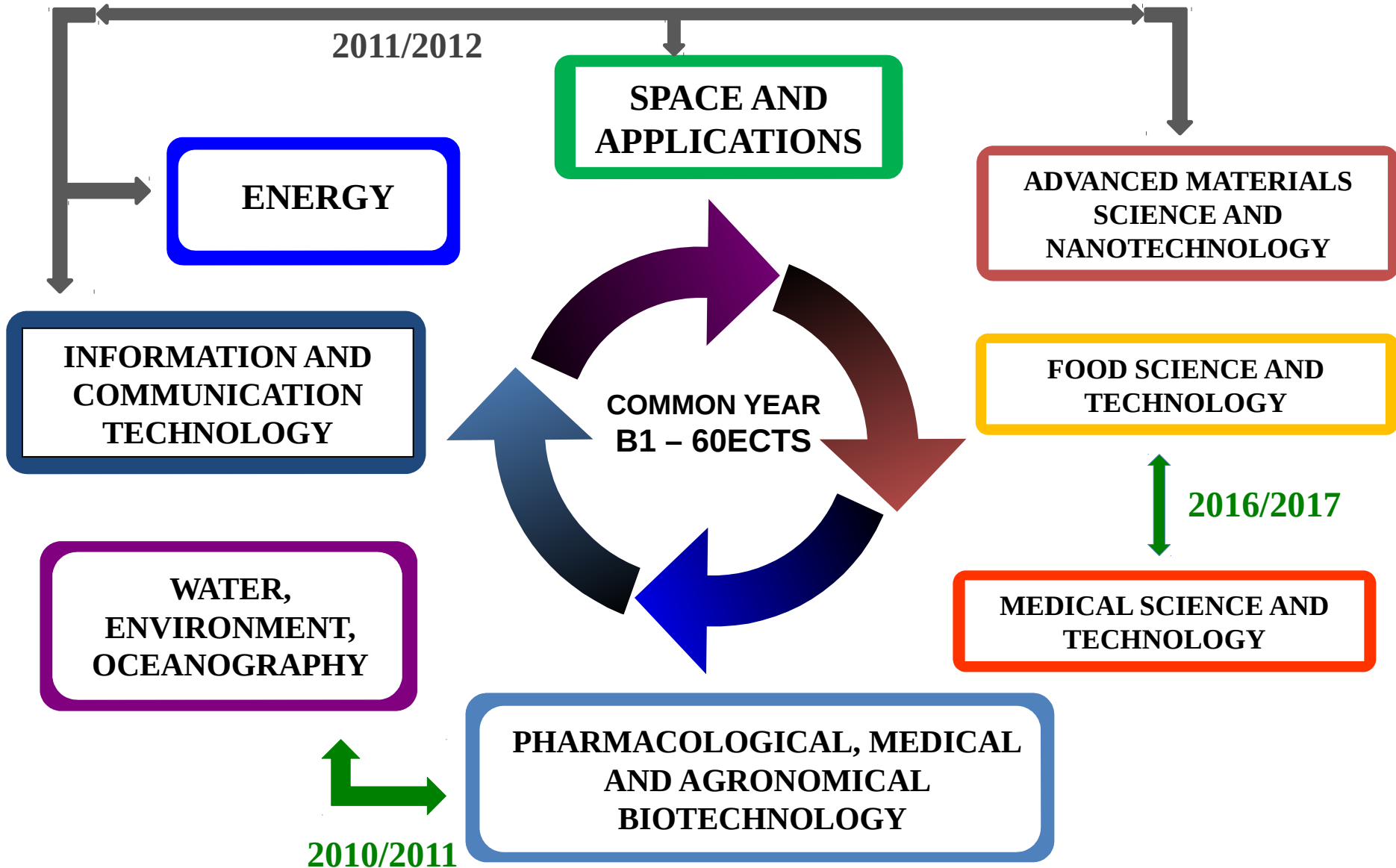


Let's
embrace
space

Thank you for your attention

BACKUP SLIDES

BACHELOR (3 years – 180 ECTS): 8 pluridisciplinary thematics

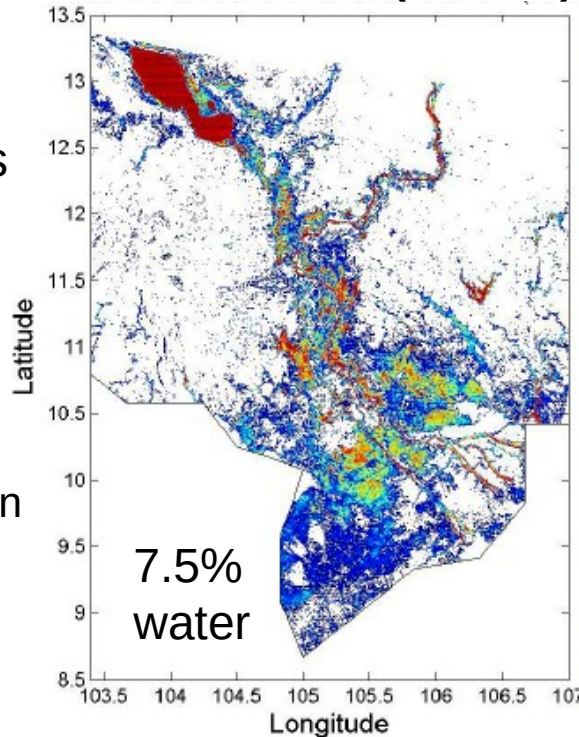


Example of a PhD results (Pham Duc Binh, at Paris Observatory):

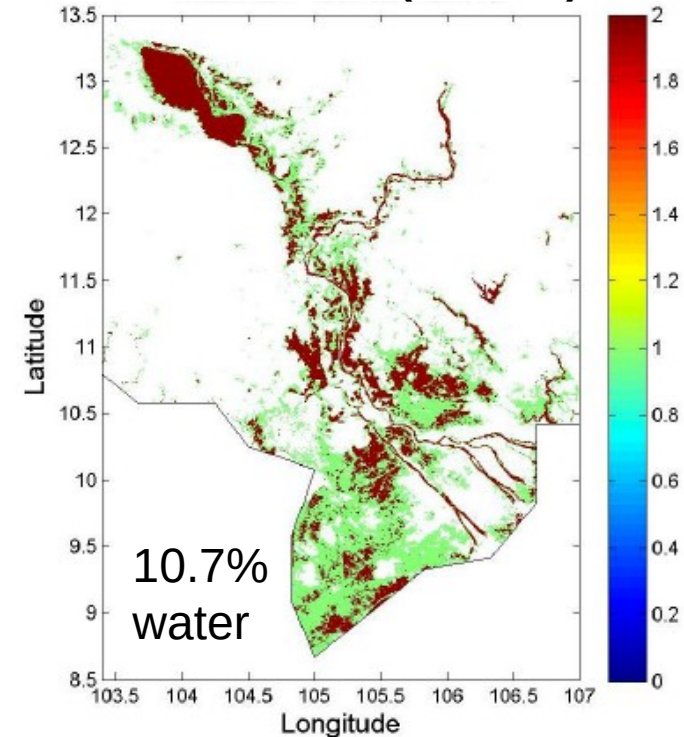
Satellite remote sensing of the variability of the continental hydrology cycle in South East Asia over the last two decades

Surface water maps

SAR Sentinel 1 (10/2015)



VIS/IR MODIS (10/2015)



77.5% spatial correlation